

Claims

[c1] What is claimed is:

1.A method for analyzing final test parameters, the method being utilized for analyzing a plurality of product lots, each of the plurality product lots having a lot number, the plurality of product lots being fabricated through a plurality of equipment, a wafer in each product lot being tested according to a plurality of final test items to generate a plurality of final test parameters, the final test items, the final test parameters, and a packaging process step correlated to the final test items being stored in a database, the method comprising:
retrieving the final test parameters of the plurality of product lots by searching the database;
comparing the final test parameters to select a representative final test parameter and a corresponding representative final test item;
determining if the representative final test item is correlated to the packaging process step;
classifying the plurality of product lots into at least two first groups according to their test parameters of the representative final test item if the representative final test item is correlated to the packaging process step, the

first product groups comprising a first qualified group and a first failed group;
searching for the equipment through which the first qualified group had passed in the packaging process step;
searching for the equipment through which the first failed group had passed in the packaging process step; and
determining the equipment having a probability of having processed the first failed group greater than a probability of having processed the first qualified group.

- [c2] 2.The method of claim 1, wherein the representative final test item is a killed final test item.
- [c3] 3.The method of claim 2, wherein the killed final test item is the final test item having the highest failure rate.
- [c4] 4.The method of claim 2, wherein the killed final test item is the final test item in which the average of the failure rate of the plurality of lots of wafers is the highest one.
- [c5] 5.The method of claim 1, wherein a commonality analysis means is utilized to determine the equipment having a probability of having processed the first failed group greater than a probability of having processed the first

qualified group.

[c6] 6.The method of claim 1, wherein each wafer in each product lot is tested according to an in-line quality control (in-line QC) item and a sample test item correlated to the final test item to generate an in-line quality control parameter and a sample test parameter, the in-line quality control item, the sample test item, the in-line quality control parameter, and the sample test parameter are stored in the database, the method further comprises:

classifying the plurality of product lots into at least two second groups according to their test parameters of the representative final test item if the representative final test item is determined as not correlating to the packaging process step, the second product groups comprising a second qualified group and a second failed group;

searching for at least one in-line quality control item or sample test item correlated to the representative final test item, and related test parameters of the second qualified group and the second failed group from the database;

statistically analyzing if there is a discrepancy between the searching results of the second failed group and the second qualified group;

stopping analyzing if there is not a discrepancy between

the searching results;

statistically analyzing if there is an obvious discrepancy between an out-of-spec portion in the second failed group and that in the second qualified group according to a first spec if there is discrepancy between the searching results;

judging that it is deviation of testing results of the in-line quality control item or the sample test item correlated to the representative final test item causing the over high representative final test parameter if there is an obvious discrepancy according to the first spec;

statistically analyzing if there is an obvious discrepancy between an out-of-narrowed spec portion in the second failed group and that in the second qualified group according to a narrowed spec if there is not an obvious discrepancy according to the first spec;

stopping analyzing if there is not an obvious discrepancy according to the narrowed spec; and

judging that it is the in-line quality control item or the sample test item correlated to the representative final test item causing the over high representative final test parameter if there is an obvious discrepancy according to the narrowed spec.

[c7] 7. The method of claim 6, wherein a discrepancy between the searching results of the second failed group and that

of the second qualified group is determined by determining if there is a discrepancy between a mean of the searching results of the second failed group and that of the second qualified group and if there is a discrepancy between a variance of the searching results of the second failed group and that of the second qualified group.

- [c8] 8.The method of claim 6, wherein the first spec comprises a first up spec limit (USL) and a first low spec limit (LSL).
- [c9] 9.The method of claim 8 further comprising determining if there is a discrepancy between a ratio of a number of product lots in the second failed group exceeding the first up spec limit to a total number of product lots in the second failed group, and a ratio of a number of product lots in the second qualified group exceeding the first up spec limit to a total number of product lots in the second qualified group.
- [c10] 10.The method of claim 8 further comprising determining if there is a discrepancy between a ratio of a number of product lots in the second failed group lower than the first low spec limit to a total number of product lots in the second failed group, and a ratio of a number of product lots in the second qualified group lower than the first low spec limit to a total number of product lots in

the second qualified group.

- [c11] 11.The method of claim 8, wherein the narrowed spec comprises an up narrowed spec limit and a low narrowed spec limit, the up narrowed spec limit is smaller than the first up spec limit, and the low narrowed spec limit is greater than the first low spec limit.
- [c12] 12.The method of claim 11, wherein a range of the first spec is six times a standard deviation, the up narrowed spec limit is one standard deviation smaller than the first up spec limit, and the low narrowed spec limit is one standard deviation greater than the first low spec limit.
- [c13] 13.The method of claim 11 further comprising determining if there is a discrepancy between a ratio of a number of product lots in the second failed group exceeding the up narrowed spec limit to a total number of product lots in the second failed group, and a ratio of a number of product lots in the second qualified group exceeding the up narrowed spec limit to a total number of product lots in the second qualified group.
- [c14] 14.The method of claim 11 further comprising determining if there is a discrepancy between a ratio of a number of product lots in the second failed group lower than the low narrowed spec limit to a total number of product lots

in the second failed group, and a ratio of a number of product lots in the second qualified group lower than the low narrowed spec limit to a total number of product lots in the second qualified group.

- [c15] 15. The method of claim 6, wherein a CDF plot is utilized to output the testing results of the in-line quality control item or the sample test item correlated to the representative final test item if there is an obvious discrepancy according to the first spec.
- [c16] 16. The method of claim 6, wherein a CDF plot is utilized to output the testing results of the in-line quality control item or the sample test item correlated to the representative final test item if there is an obvious discrepancy according to the narrowed spec.